Sediment Sampling Plan for Proposed Marina Dredging

Glen Cove Creek Mixed-Used Waterfront Redevelopment Project
City of Glen Cove
Nassau County, NY

Applicant: RXR Realty
Contact. Thomas Graham, Vice President, Project Executive
625 RXR Plaza, Uniondale, NY 11556
Tel. (516) 506-6636
Email. tgraham@rxrrealty.com

Prepared By: Kelly Risotto, Senior Ecologist
Land Use Ecological Services, Inc.
570 Expressway Drive South, Suite 2F, Medford, NY 11763
Tel. (631) 727-2400
Email. krisotto@landuse.us

Ellis Koch, Consulting Director
Posillico Consulting
1750 New Highway, Farmingdale, NY 11735
Tel. (631) 390-5755
Email. ellis.koch@gmail.com

Date of Preparation: June 24, 2014
Revised: September 24, 2014
October 20, 2014
May 20, 2015

Table of Contents

Appendices

List of Figures

List of Tables

1 INTRODUCTION

The Glen Cove Creek Mixed-Use Waterfront Redevelopment project has undergone extensive environmental review pursuant to the State Environmental Quality Review Act (SEQRA). A Draft Environmental Impact Statement (EIS) and Final EIS were prepared and underwent extensive agency and public review. The FEIS was accepted by the City of Glen Cove in July 2011. The City issued a Statement of Findings in December 2011. The DEIS and other project documents are available on the City of Glen Cove website (http://www.glencove-li.us/index.php/project-updates/27-waterfront-project). The FEIS and Statement of Findings are available upon request.

For the purposes of this sediment sampling plan for dredging activities, discussion of the site shall be limited to the conditions within Glen Cove Creek subject to dredging activities for the proposed marinas.

1.1 Project Location

The Glen Cove Creek Mixed-Use Waterfront Redevelopment project is located along the north shore of Glen Cove Creek in the City of Glen Cove, Nassau County, NY (Figure 1). The site is bounded on the west by Hempstead Harbor (Mosquito Cove), on the east by Charles Street, on the north by Garvies Point Preserve and Janet Lane, and on the south by Glen Cove Creek. A 2011 illustration of the entire Glen Cove Creek Mixed-Use Waterfront Redevelopment Project is provided in Figure 2, the PUD Master Development Plan as contained in the approved FEIS.

Figure 1. Location map showing the Glen Cove Creek Mixed-Use Waterfront Redevelopment Project site.

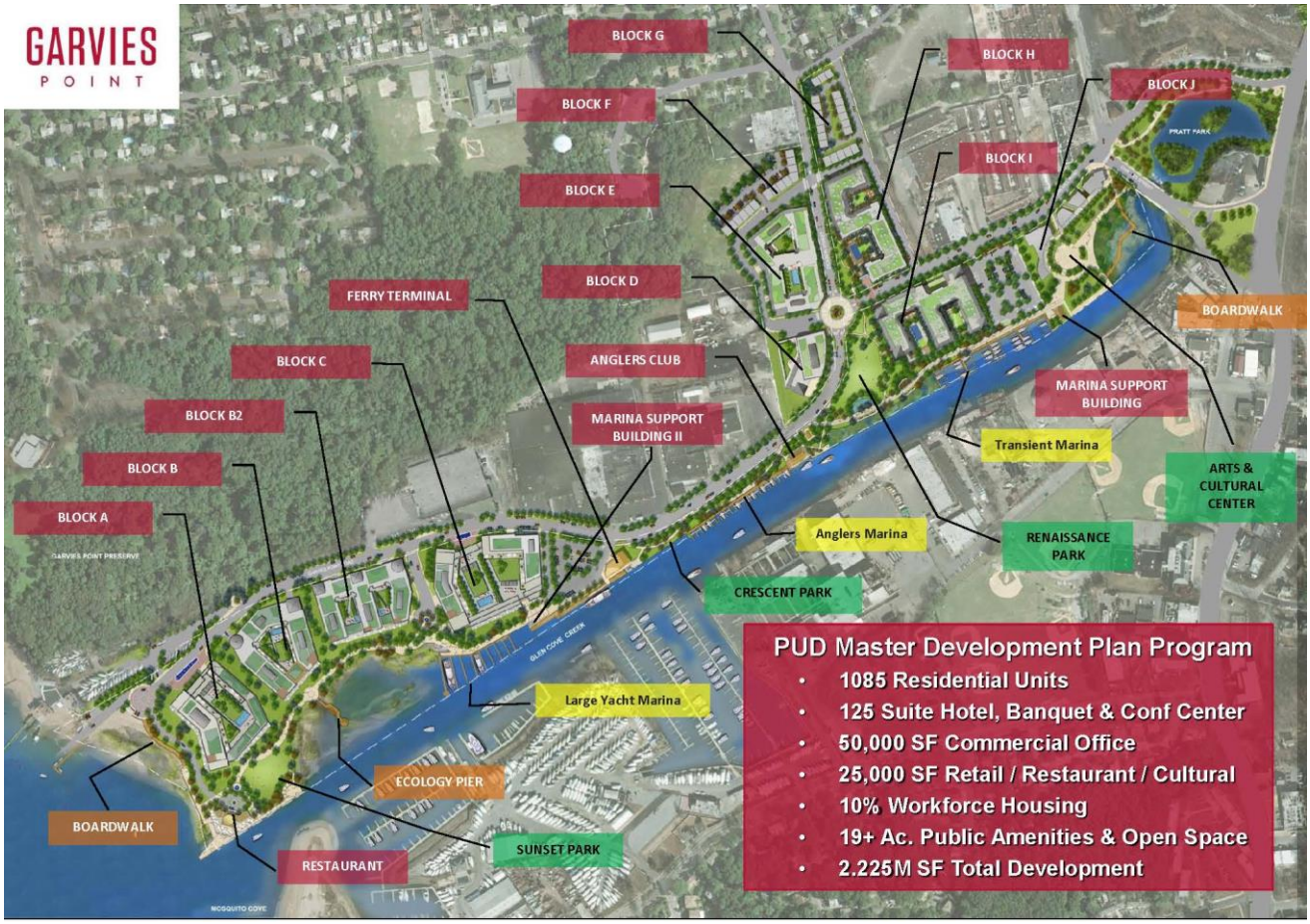


Figure 2. Project Site depicted in the illustration of the approved PUD Master Development Plan (FEIS, 2011).

1.2 Site History

The Glen Cove Creek area had become a center of industry by the latter half of the 19th Century. Numerous types of industrial companies used the Creek for transportation, including, the famed Duryea Corn Starch Manufacturing Company on the south side of the Creek. Heavy industrial usage of the area continued throughout the 19th and early 20th centuries. However, as trucking began to become more significant for the movement of goods in the 1940s, the area around Glen Cove Creek lost its competitive advantage. Industry thereafter experienced a slow decline up to the early 1990s. By that time, the north side of Glen Cove Creek was heavily characterized by vacant land. As a result of its industrial legacy, most of the abandoned industrial sites contained hazardous wastes. The project site consists of multiple properties having known or potential environmental impacts, summarized as follows (Figure 3):

- Li Tungsten (Federal Superfund & New York State {NYS}Superfund Site)
- Captain's Cove (NYS Superfund Site including a delisted portion)
- Angler's Club Site
- Gladsky Site (ERP site)
- City of Glen Cove Sewage Pumping Station Site
- Doxey Site (NYS Spill Program)
- Gateway Properties (consisting of seven tax lots, including, Windsor Fuel and Nassau Ready-mix, Brilliant Electric and Air, and an office building)

Figure 3. Environmentally impacted sites within the Glen Cove Creek Project Area.
Prepared By: Saccardi & Schiff, Inc.
Sources: NYS GIS Clearinghouse and PWGC Strategy Environmental and Engineering Solutions.

A number of the properties within the proposed development have undergone remediation under, and are subject to, ongoing United States Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC) environmental regulatory programs. The agencies identified remedial or cleanup goals for the specific contaminant of concern, affected environmental media (e.g., soil, sediment, surface water, ground water and/or soil vapor), and proposed future land use for each property in question. Other properties within the proposed development have been subject to indirect (Phase I Environmental Site Assessment {ESA}) and/or direct (Phase II ESA) investigation, which have identified potential or known environmental conditions.

Ninety percent of the proposed development area is occupied by the Li Tungsten (LT) and Captain's Cove (CC) remediation sites. EPA conducted remediation at the LT site, which consists of various parcels, under the federal Superfund Program. The goal of the cleanup was to restore the overall LT site to a commercial use standard. EPA subsequently deemed the cleanup met a standard sufficient for residential use for all but one parcel of the property, Parcel A (EPA, 2005 Explanation of Significant Differences). EPA requires that engineering controls be installed on Parcel A for it to meet restricted residential use standards.

The CC site was remediated under the NYS Inactive Hazardous Waste Remediation Program. NYSDEC agreed that the Record of Decision (ROD) could be modified to allow restricted residential use at CC upon the use of engineering and institutional controls, and the filing of an Environmental Easement. The NYSDEC has approved Site Management Plans (SMP) for both parts of CC.

The eastern portion of the CC site is leased to the City of Glen Cove (City) for use as a ferry terminal. The City has constructed the ferry terminal foundation, parking lot and bulkhead/dock improvements. During construction, the Ferry Terminal SMP was used to guide soil management activities. As the ferry terminal bulkhead had to be reconstructed and Glen Cove Creek had to be dredged to accommodate ferry vessels, the Ferry Terminal SMP includes approved procedures for testing the area proposed for dredging; these procedures have been used in preparation of this Sediment Sampling Plan for the three new marinas in the approved Glen Isle Site Plan.

1.3 Tidal Wetlands

The majority of the study area, as well as a significant portion of Glen Cove Creek, exhibits characteristics typical of intense commercial and industrial use occurring over extended historical time periods. Glen Cove Creek consists of a 1.1 mile long navigational channel extending from the head of Mosquito Cove to Charles Street. The navigational channel represents extensive man-made alterations begun in 1925 by the United States Army Corps of Engineers (USACE) to the tidal estuary.

Historical dredging and shoreline hardening structures in the area have resulted in the elimination of all natural shoreline areas with the exception of the tidal wetlands located at Captain's Cove and at the Garvies Point Beach (Figure 4). These areas contain remnants of the natural shoreline assemblages formerly common within the Hempstead Harbor estuary.

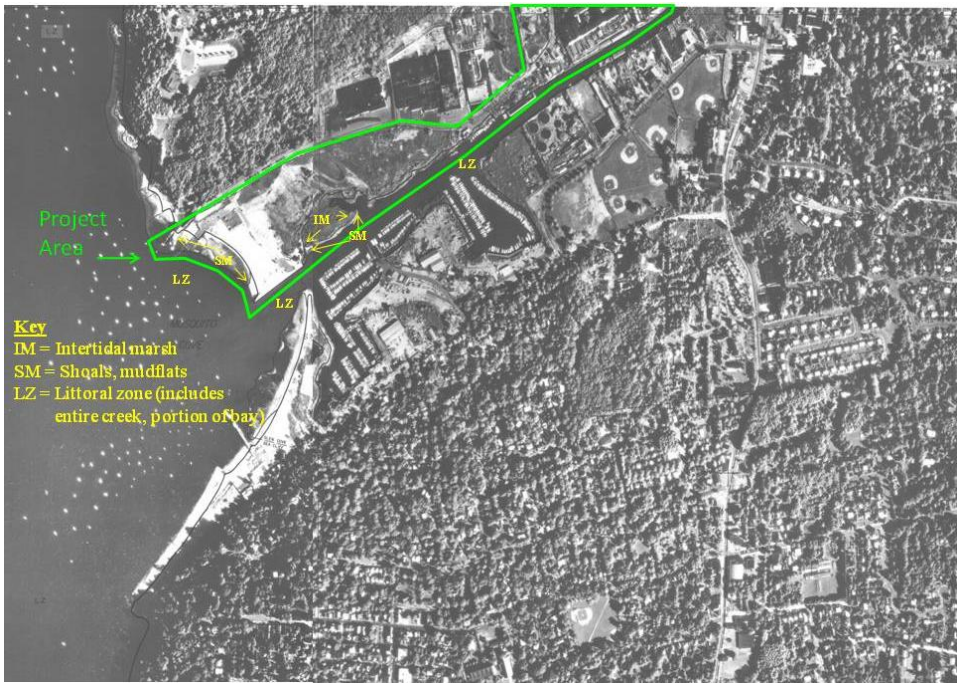


Figure 4. Portions of NYSDEC tidal wetlands maps #612-522 and #614-522 (NYSDEC, 1974).

1.3.1 Garvies Point Beach

Garvies Point Beach is an open, sandy beach is located at the terminus of Garvies Point Road. The beach is sparsely vegetated with only a narrow band of pioneer and weedy plant species located in the upper portion of the beach landward of the high water line. Below the high water line, the vegetation consists of patches of smooth cord grass (*Spartina alterniflora*) interspersed within large areas of open shoals and mudflats. The tidal wetlands at Garvies Point Beach are classified as Coastal Shoals, Bars and Flats

(SM) by the NYSDEC. Approximately 380 linear feet of shoals, mudflats and intertidal wetlands are present at Garvies Point Beach.

Intertidal sediments at Garvies Point Beach consist of sand with abundant gravel and shells, as characterized by Land Use Ecological Services during invertebrate sampling on May 12, 2009. Anaerobic conditions were observed within 1-2" of the sediment surface at three sampling locations at Garvies Point Beach, as expected in permanently inundated wetland sediments.

1.3.2 Captain's Cove

The area known locally as Captain's Cove has intertidal and high marsh habitats, dominated by smooth cord grass (*Spartina alterniflora*), common reed (*Phragmites australis*), and marsh elder (*Iva frutescens*), and open areas of shoals and mudflats. The steeply sloped transition zone located landward of the intertidal and high marshes in Captain's Cove contains a variety of invasive pioneer species such as common reed (*Phragmites australis*), tree of heaven (*Ailanthus altissima*), mugwort (*Artemisia vulgaris*), and honey locust (*Gleditsia triacanthas*). Much of this transition slope contains large amounts of concrete and debris previously deposited to harden and stabilize the slope.

Intertidal sediments at Captain's Cove were characterized by Land Use Ecological Services on May 12, 2009 during invertebrate sampling. Sediments consist of silty sands with anaerobic conditions within 1-2" of the surface. Adjacent to Captain's Cove, in the area of the proposed Large Vessel Marina, the sediments were coarser and consisted of sands with some gravel and shells and anaerobic conditions within 5" of the sediment surface.

Tidal wetlands within Captain's Cove are classified as: (1) Intertidal Marsh (IM) and (2) Coastal Shoals, Bars and Flats (SM) by the NYSDEC. In total, approximately 1,030 linear feet of intertidal wetlands and shoals/mudflats are present in Captain's Cove.

1.4 Significant Coastal Fish & Wildlife Habitat

Glen Cove Creek is not within a Significant Coastal Fish & Wildlife Habitat (SCFWH) as identified by NYS. Hempstead Harbor and Mosquito Cove are within the Hempstead Harbor SCFWH as shown on Figure 5.

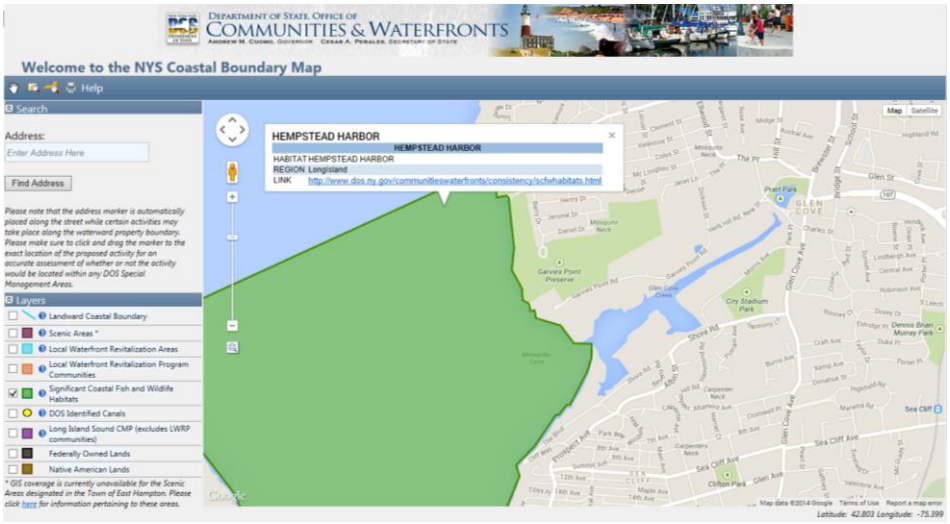


Figure 5. NYSDOS Significant Coastal Fish & Wildlife Habitat Map.

http://appext20.dos.ny.gov/coastal_map_public/map.aspx

1.5 Essential Fish Habitat (EFH)

Hempstead Harbor has been identified as an EFH for one or more life cycles of 15 species of finfish by National Marine Fisheries Service (NMFS). In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, an EFH Assessment was included in the FEIS accepted by the City of Glen Cove in July 2011.

1.6 Stormwater Discharge

Under existing conditions, stormwater for this site is handled by four existing drainage pipe systems located within Garvies Point Road. Three (3) of these discharge (outfall) pipes drain directly into Glen Cove Creek without any treatment and one (1) discharges directly to Hempstead Harbor, just south of the existing boat ramp, also without any treatment. Several off-site areas drain onto or through the project site including the Garvies Point Preserve, industrial development on the north side of Garvies Point Road and the industrial/commercial development located on the north side of Herb Hill Road.

2 DESCRIPTION OF PROPOSED DREDGING

The following sections describe in-water dredging and associated activities for the three marinas proposed in the Glen Cove Creek Mixed Use Waterfront Redevelopment Project. More detailed information on the entire waterfront redevelopment project is contained in the EIS prepared for the project and accepted by the City of Glen Cove in 2011 (http://www.glencove-li.us/index.php/project-updates/27-waterfront-project).

Information on the proposed dredging is based on site plans last revised in December 2014 and contained in Appendix A.

2.1 Small Vessel Marina

On the east side of Captain's Cove, within the 290' of waterfront bulkhead containing the existing "Regina Maris" display, the applicants are proposing to construct a small vessel marina. Construction of the small vessel marina will incorporate the relocation of existing intertidal wetlands, stabilization of the wetland area to the west of the docking facility, reconstruction of the existing bulkhead, dredging, and construction of docks.

Approximately 32,085 square feet within the large vessel marina area will be dredged to provide -6' depth at mean low water (MLW). An estimated 5,052 cubic yards of spoil will be removed and disposed of at an approved upland site.

2.2 Angler's Club

The former "Angler's Club" facility will be relocated and reconstructed to provide small boat transient dockage, allowing access to the revitalized waterfront from adjoining waterways. Existing Angler's Club facilities, including the club building and docks, will be relocated approximately 335' east of the current location. Construction activities within new Angler's Club area will include dredging, removal of the existing 795' of bulkhead, reconstruction of new bulkhead 0-25' landward of existing, and reconstruction of the docking facilities.

The new Angler's Club location will be excavated (upland) and dredged (creek) to a depth of -6' MLW. Approximately 22,789 square feet shall be dredged/excavated for the new Angler's Club. An estimated 3,587 cubic yards of spoil will be disposed of at an approved upland site.

2.3 Low-Sill Wetlands Restoration

Construction activities proposed for Renaissance Park, east of the relocated Angler's Club, include upland excavation, removal of the existing steel bulkhead, construction of a low sill bulkhead, construction of a bulkhead at elevation 11' NAVD, and intertidal marsh creation.

Creation of the 20,726 square-foot intertidal marsh area will require excavation of approximately 13,865 cubic yards of upland material. Excavation shall be done prior to removal of the existing steel bulkhead, with sediment disposal at an approved upland site.

2.4 Transient Marina

East of the low sill bulkhead area at Renaissance Park, a transient marina will be constructed, including dredging/excavation and bulkhead removal. Prior to bulkhead removal, the proposed marina shall be excavated (upland) and dredged (creek) to a depth of -6' MLW. Approximately 10,052 square feet of creek shall be dredged and 33,428 square feet of upland shall be excavated. An estimated 12,106 cubic yards of sediments (1,582 cy dredging, 10,524 cy upland excavation) will be disposed of at an approved upland site.

3 SEQUENCE OF SAMPLING, APPROVALS AND CONSTRUCTION

The following outlines a sequencing summary for the Glen Cove Creek Waterfront Redevelopment Project through to construction activities:

1) Preparation of the Sediment Sampling Plan, based on December 2014 Waterfront Redevelopment Project Site Plans. Sediment Sampling Plan shall be reviewed and approved by NYSDEC [Bureau of Habitat – Tidal Wetlands (BOH-TW), Division of Environmental Permits (DEP), Division of Environmental Remediation (DER), and Division of Materials Management DMM)] and USEPA prior to conducting the sampling.
2) Sampling of sediments proposed for excavation or dredging with the Waterfront Redevelopment Project. Results to be submitted to BOH-TW, DEP, DER, DMM, and USEPA for review.
3) Dredging and Excavation Work Plan to be prepared based on sediment sampling results. Work Plan to include construction sequence, methodology for dredging/excavation, material handling/storage, dewatering (as necessary), and disposal. Plan shall cross reference the Waterfront Redevelopment Site Plans as applicable.
4) Waterfront Redevelopment Site Plans to be updated to include reference to the Dredging & Excavation Work Plan for construction sequence, methodology, material handling/storage, and disposal.

4 SEDIMENT SAMPLING PLAN FOR PROPOSED MARINA DREDGING

This sediment sampling plan has been prepared for the proposed dredging within Glen Cove Creek associated with construction of the Small Vessel Marina, Angler's Club, Low-Sill Wetlands, and

Transient Marina as described in Section 2. This plan is based on the information contained on the December 2014 Site Plans (Appendix A), inclusive of dredge footprint, depth, and material quantity.

Sampling of upland sediments associated with the Angler's Club marina, Low-Sill Wetland and Transient Marina areas has been previously conducted in accordance with the "Pre-Construction Confirmatory/Data Gap Subsurface Investigation Work Plan" (PW Grosser, December 2013), modified according to the Gladsky Marine Site Management Plan (Dvirka & Bartilucci, August 2013) that does not require radiological monitoring. Results of the prior upland sampling effort shall be compiled and submitted in a complete package with results from the proposed sampling outlined in this plan, for review by regulatory agencies. Per discussion with NYSDEC Bureau of Habitat – Tidal Wetlands (BOH-TW) staff, additional sampling of the Low-Sill Wetland and Transient Marina areas, currently beyond Article 25 (tidal wetlands) jurisdiction, will not be required if excavation of upland sediments to below the proposed low-sill wetland / marina elevations is performed prior to bulkhead removal. This guidance is based on the premise that excavation to below these elevations prior to bulkhead removal will prevent any potentially contaminated sediments from entering the creek.

Sampling of upland sediments for the Upper Reach of Glen Cove Creek wetland restoration area will be conducted following acquisition of the site by the applicant. Upland samples for the Upper Reach of Glen Cove Creek wetland restoration area will be tested for parameters listed in TOGS 5.1.9 and 6NYCRR Part 375 (Appendix C).

4.1 Radiation Monitoring

Prior sediment sampling efforts associated with remediation of the Li Tungsten and Captain's Cove sites have documented elevated radiation levels in the vicinity of the proposed marinas. An extensive dredging project was completed as described in the Li Tungsten OU-IV Final Remedial Action Report (USACE, October 2007), to remove all detected radioactive materials in the creek sediment to a depth of 1 foot below the navigational dredging depth of 10 feet below MLW. Soils excavated/dredged from the Small Vessel Marina, Angler's Club and Transient Marina sites will be monitored for radiation to assess the potential for radiation contamination and to enable preparation of the Dredging and Excavation Work Plan with consideration for additional radiation monitoring and/or handling (as necessary based on screening performed herein).

Safety and Ecology Corporation (SEC) shall perform radiation monitoring of the sediment samples collected under this plan. SEC is licensed through the Commonwealth of Kentucky and the Nuclear Regulatory Agency Agreement States Program. SEC has been issued Radioactive Materials License number 201-650-90 for decontamination, demolition or removal, radiological survey, sampling, processing, packaging and transport for disposal or transfer to facilities authorized to store, process or dispose of radioactive materials.

Radiation screening will be conducted using a count-rate meter and scaler, such as a Ludlum™ Model 2221 equipped with a 2-inch by 2-inch sodium iodide (NaI) detector. The rate meter/scaler will be calibrated in accordance with manufacturer's specifications, using a range of NBS source materials standards (or traceable to NBS standards). A range of response configurations will be used during the calibration process. Meter response will be checked throughout the day using the source provided with

the meter; these checks will be recorded in a log book. Calibration records and response checks will be kept on site during sampling, and will be included in the Sediment Sampling Results report.

An ambient gamma background value will be established within the boat prior to beginning sediment sampling activities in the creek. This ambient background value is used during scanning of soil cores to provide a reference point for determining whether the materials appear to be impacted with radioactivity.

Radiation screening shall be performed on each sample collected as part of this Sediment Sampling Plan. The monitoring protocol described below was designed to effectively detect gamma radiation within soil cores.

- Prior to performing soil borings, 10-mil polyethylene sheeting, sufficiently large to hold the anticipated number of soil cores will be laid on the ground in the area where the soil borings will be performed.
- Once cores are collected, each sleeve of soil/sediment will be wiped down upon removal from casing and verified to be free of removable radioactivity using a calibrated Ludlum Model 12 rate-meter with 44-9 pancake probe.
- Each core will then be scanned using the Ludlum™ Model 2221 count-rate meter and scaler (or equivalent) equipped with a Ludlum™ Model 44-10 (2" x 2") sodium iodide (NaI) detector. Screening will be performed by holding the meter approximately 1 inch above the soil surface and moving it over the surface being scanned at a rate not to exceed 0.5 meters per second (m/s). If the count rates exceed two times the background levels, the sample core information and location of the high count rate within the core (i.e. segment, as identified in Section 4.2) will be recorded in the field log book with the maximum and minimum number of count rates observed (rounded to the nearest 100 cpm).

Creek Monitoring Procedures

As specified in the Dredging & Excavation Work Plan prepared for the City of Glen Cove Ferry Terminal Project (Apex Companies, July 2010) each sediment core associated with the creek bottom sediment sampling program will be field screened as described above utilizing either a Geiger-Mueller frisker (i.e., Ludlum™ 44-9 or equivalent) or a Ludlum™ 44-10 or equivalent sodium iodide (NaI) detector, depending on background radiation levels. If a Model 44-9 detector is used, the screening limit is 100 counts per minute (cpm) above background; background is expected to be approximately 50 cpm or less on a 44-9 detector. If the NaI detector is used, the screening limit is 30,000 cpm above background. Background on the NaI detector is expected to be approximately 10,000 cpm or less.

Any creek sediment sampling cores exceeding the applicable screening limits will be segregated for additional testing and or disposal. Subsequent testing should include gamma spectroscopy, and isotopic radium and isotopic thorium alpha spectroscopy analyses at a laboratory licensed to receive radioactive materials.

At the end of each day and prior to coffee or lunch breaks, surveys will be performed by SEC technicians to ensure personnel and equipment are free of radioactive contamination.

4.2 Sampling Methodology

Sampling of the proposed dredge areas shall be conducted in accordance with guidance provided in/by the following:

- Technical & Operational Guidance Series (TOGS) 5.1.9: In-Water and Riparian Management of Sediment and Dredged Material (NYSDEC, 2004)
- 6NYCRR Part 375: Environmental Remediation Programs (NYSDEC , 2006)
- Pre-Construction Confirmatory/Data Gap Subsurface Investigation Work Plan (PW Grosser, December 2013)
- Dredging / Excavation Work Plan, Glen Cove Ferry Terminal (Apex Companies, July 2010)
- Site Management Plan: Glen Cove Ferry Terminal (Dvirka and Bartilucci, 2009)
- Consultation with NYSDEC's Division of Materials Management (P. Hourigan), Bureau of Marine Habitat Protection, and Division of Permits

Sampling will be conducted at each of the three proposed marina dredge areas: Large Vessel Marina, Angler's Club, and Transient Marina. Soil samples will serve to evaluate dredge spoil sediments for evidence of contaminants, and to characterize fill for potential re-use or disposal at an approved upland site or landfill.

Core samples shall be collected at sixteen (16) soil boring locations: Large Vessel Marina (1-4), Angler's Club (5-8, 14-16), and Transient Marina (9-13) [Figure 6 - Sediment Sample Locations]. The number of sample sites was selected based on the sampling requirements for proposed dredging contained in the Glen Cove Ferry Terminal Site Management Plan (Dvirka & Bartilucci, 2009).

Sediment cores shall be collected using a vessel-mounted vibra-core sampling rig or gravity corer down to one foot below dredge depth, for a total core depth of 9-11 feet for the Large Vessel Marina, 0-3 feet for the Angler's Club creek dredging, 14-16 feet for the Angler's Club upland excavation, and 1-3 feet for the Transient Marina (Table 1). Each core will be logged for soil characteristics in the field by a geologist, using the United States Geological Survey (USGS) Unified Soil Classification system. All sample collections will follow established protocols and procedures consistent with the sediment sampling guidance provided in Appendix C of NYSDEC TOGS 5.1.9 (*In-Water and Riparian Management of Sediment and Dredge Material*).

Table 1. Core depths for dredge and excavation sediment samples at three marinas proposed in Glen Cove Creek.

Sample ID	Location	Bottom Elevation re: NGVD (FT @ NGVD)	Bottom Elevation re: MLW (FT @ MLW)*	Core Depths (FT)			
				Segment A (Dredge Material)	Segment B (0-6" below dredge depth)	Segment C (6-12" below dredge depth)	Total Core Depth (to nearest FT)
1	Large Vessel Marina	-0.8	2.0	-9.0	-0.5	-0.5	-10
2	Large Vessel Marina	-1.8	1.0	-8.0	-0.5	-0.5	-9
3	Large Vessel Marina	-0.1	2.7	-9.7	-0.5	-0.5	-11
4	Large Vessel Marina	-2.8	0.0	-7.0	-0.5	-0.5	-8
5	Angler's Club	-9.8	-7.0	1.0	-0.5	-0.5	0
6	Angler's Club	-7.0	-4.2	-1.8	-0.5	-0.5	-3
7	Angler's Club	-7.5	-4.7	-1.3	-0.5	-0.5	-2
8	Angler's Club	-7.8	-5.0	-1.0	-0.5	-0.5	-2
9	Transient Marina**	-11.8	-9.0	0.0	-0.5	-0.5	-1
10	Transient Marina**	-10.8	-8.0	0.0	-0.5	-0.5	-1
11	Transient Marina	-8.7	-5.9	-0.1	-0.5	-0.5	-1
12	Transient Marina	-6.6	-3.8	-2.2	-0.5	-0.5	-3
13	Transient Marina**	-8.8	-6.0	0.0	-0.5	-0.5	-1
14	Angler's Club Upland	4.2	7.0	-13.0	-0.5	-0.5	-14
15	Angler's Club Upland	6.3	9.1	-15.1	-0.5	-0.5	-16
16	Angler's Club Upland	5.7	8.5	-14.5	-0.5	-0.5	-16

* Bottom elevation at MLW based on bathymetric survey performed by Advanced American Engineering, reference to MLW, in June 2014.

** Dredging not required based on existing depths. However, exposed bottom and below bottom sediments will be collected and analyzed.

Sample containers will be supplied by the testing laboratory. The containers will be laboratory cleaned, pre-preserved and sealed with the appropriate documentation. All sample containers will be labeled using a permanent marker to indicate the date, time, sample location, and sample identification number. This information will also be recorded in a field log book and on a chain of custody form that will follow the samples. Once each sample container is filled, capped and labeled, it will be appropriately packaged to prevent breakage and placed in an ice-filled insulated cooler, maintained at a temperature of 4° C, until the samples are delivered to the laboratory within 24 hours of collection. Sample numbering shall be formatted as follows:

Each sample segment will be given a sample test number according to the format
FC /LL/CS/SS-EE/ DDMMYYYY, where:

FC = RXR (facility code)
LL = Location according to ID on Sediment Sampling Plan (e.g. 1-13). For VOC grab sample, add GS after ID.
CS = Core Segment: (A) material to be dredged, (B) 0" to 6" below post-dredging bottom, (C) 6" to 12" below post-dredging bottom
SS–EE = sample depth interval (in inches) from which sample was collected (SS = start depth, EE = end depth)
DDMMYYYY = day, month and year of the sample collection

Each soil and sediment sample core will be inspected for visibly distinct layers. If distinct layers are apparent, they will be analyzed separately. However, if the sediment in the core is reasonably consistent, the core will be divided into three sections for analysis. The top section (Segment A),

comprised of the surface to depth material, represents an analysis of the material to be dredged. The second section (Segment B), comprised of the first six inches of material below the dredging depth, represents the bottom sediment that will be exposed after the dredging is completed. The third section (Segment C), comprised of the six inches of material below Segment B, represents an alternative bottom which may be necessary if Segment B proves to be contaminated. Based on the site history and documented contamination of upland areas, as well as the short hold times for some contaminants that must be tested, NYSDEC is requiring that Segment C be analyzed at the same time as Segments A and B to determine if increasing the dredging depth will provide a reduction in exposed contaminant levels.

Once Segment boundaries are established, a grab sample shall be taken from each Segment of the core. These grab samples, which are to be used for VOC analysis in the event that such analysis is required, shall be preserved, undisturbed, with no headspace in the jar, to avoid volatilization of chemical compounds. After the VOC grab sample is taken, each Segment (A, B, C) shall be composited, and sufficient material from each composited Segment shall be taken for analysis as outlined in Section 4.3 below. For each core, this sampling procedure yields three grab samples and three corresponding composite samples.

4.3 Quality Assurance and Quality Control

Field and laboratory QA/QC procedures will be consistent with the requirements outlined in Appendix C of the NYSDEC *In-Water and Riparian Management of Sediment and Dredged Material* (TOGS 5.1.9). Testing for samples will be conducted in accordance with the following procedures and methods (Table 2):

Table 2. Procedures and methods for sediment sample testing.

Contaminants	USEPA SW-846 Method
Pesticides (Including Mirex)	8081A
Herbicide (Silvex)	8151
Total Aroclors of PCB's	8082
Volatile Organics (VOC's)	8260B
Semi-Volatile Organics (SVOC's)	8270C
Metals	6010B
Hexavalent Chromium	7196A
Cyanide	9012A
Total Organic Carbon (TOC)	9060A
Dioxin	1613B

The following information shall be collected and documented on an appropriate data sheet and submitted with the test results: field conditions, weather conditions, name of sampler, sample designation, collection method, soil description, photographs, and any pertinent information that may bear influence on sample analysis.

Samples shall remain in the custody of the sampler from the time the samples are taken through the delivery to the testing laboratory. Custody will be transferred in compliance with all applicable standards. Care will be taken to ensure that all samples are uniquely identified, vital sample characteristics are preserved, correct samples are tested and traceable to their source, samples are protected from loss and/or damage, and sample information is recorded on a sample label that corresponds to a chain-of-custody form. A chain-of-custody form shall be completed for each sample in

order to provide an accurate record that traces the possession and handling of each sample from the time of collection through performance of the analyses. The form shall contain the following information, at a minimum: sample test number (see above), date and time of collection, type of preservation (if applicable) and sampler's name.

4.4 Sample Analysis

Cores shall be photographed and each of the Segment A, B and C composite samples (see Section 4.1 above) shall be analyzed for sediment grain size and Total Organic Carbon (TOC). Grain size distribution of each sample will be determined by a sieve analysis performed in accordance with ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates. TOC of each sample will be determined in accordance with EPA Method 9060A.

If the grain size and TOC analyses determine that the composition of any sample is at least 90% sand or larger materials (10% or less material passes through No. 200 sieve) and less than 0.5% TOC, no further testing of that sample shall be performed.

Each of the Segment A, B and C composite samples containing more than 10% of material passing through the No. 200 sieve or greater than 0.5% TOC will be analyzed for all non-VOC parameters identified in Table 2 of TOGS 5.1.9 and Table 375-6.8(b) of 6NYCRR Part 375 (Environmental Remediation Programs: Remedial Program Soil Cleanup Objectives), both attached hereto as Appendix C. The appropriate corresponding grab sample (collected prior to compositing the Segments; see section 3.1 above) shall be analyzed for all VOCs in these two Tables.

Dredge sediments sampled in accordance with this Sediment Sampling Plan, and excavation sediments sampled in accordance with the Pre-Construction Confirmatory/Data Gap Subsurface Investigation Work Plan (PW Grosser, 2013), shall be analyzed to determine if there is a risk of significantly higher contaminant levels becoming exposed in the post-dredging/post-excavating bottom or of existing Class C levels not being removed by the proposed dredging/excavation. If results of these sediment analyses determine that there is risk of significantly higher contaminant levels becoming exposed in the post-dredging bottom or that existing Class C levels are not removed by the proposed dredging depth, the applicant will provide a proposed plan to mitigate the problem of elevated contaminant levels. Mitigation would be one of the following: (1) dredging to a shallower depth than planned, (2) dredging to a greater depth until cleaner sediments are exposed, or (3) dredging to a greater depth and then capping with available clean sediments. The mitigation plan will be contained in the Dredging and Excavation Work Plan to be prepared following sampling analysis and submitted to the NYSDEC and USEPA for approval.

The methods of investigation, summary of findings, and conclusions will be summarized in a Sediment Sampling Report for NYSDEC and USEPA review. The report will include soil boring logs with representative photographs, laboratory data sheets, and data summary tables. Moreover, the report will make recommendations for additional sediment characterization, design recommendations, and/or potential disposal sites to ensure that marina dredging has minimal disturbance to Glen Cove Creek and Hempstead Harbor, and provides long-term wetland and aquatic habitat sustainability.

5 LITERATURE CITED

Apex Companies, LLC. 2010. Dredging / Excavation Work Plan: Glen Cove Ferry Terminal. July 2010. 36 pages.

Dvirka and Bartilucci. 2013. Site Management Plan: Gladsky Marine Site. August 2013.

Dvirka and Bartilucci. 2009. Draft Site Management Plan: Glen Cove Ferry Terminal. June 2009. 66 pages.

NYSDEC. 2006. 6NYCRR Part 375: Environmental Remediation Programs. December 2006. 89 pages.

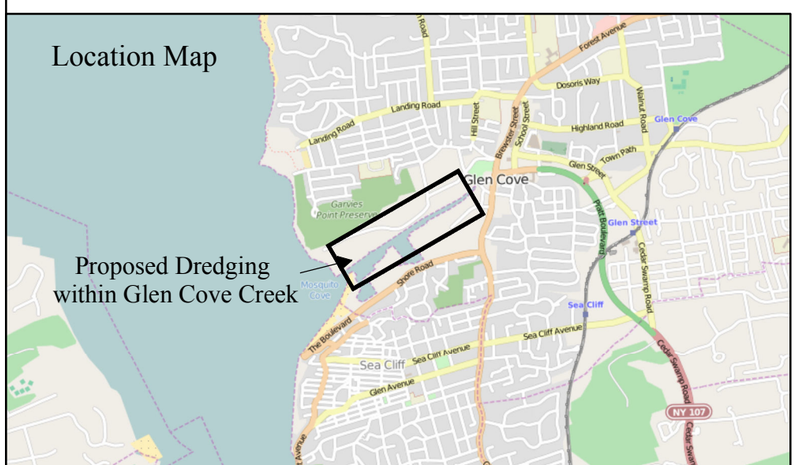
NYSDEC. 2004. Division of Water Technical & Operational Guidance Series (TOGS) 5.1.9: In-Water and Riparian Management of Sediment and Dredged Material. November 2004, Updated September 2006. 72 pages.

PW Grosser, 2013. Pre-Construction Confirmatory/Data Gap Subsurface Investigation Work Plan. December 2013.

U.S. Army Corps of Engineers (USACE). 2007. Final Remedial Action Report: Li Tungsten Superfund Site, Operable Unit 4 – Glen Cove Creek. USACE, Kansas City District. USACE Contract No W912DQ-06-D-0007, Task Order No. 002. October 2007.

Proposed Sediment Sample Locations

Base Map - 2013 orthoimages courtesy of NYS ITS (http://gis.ny.gov)



NOTES:

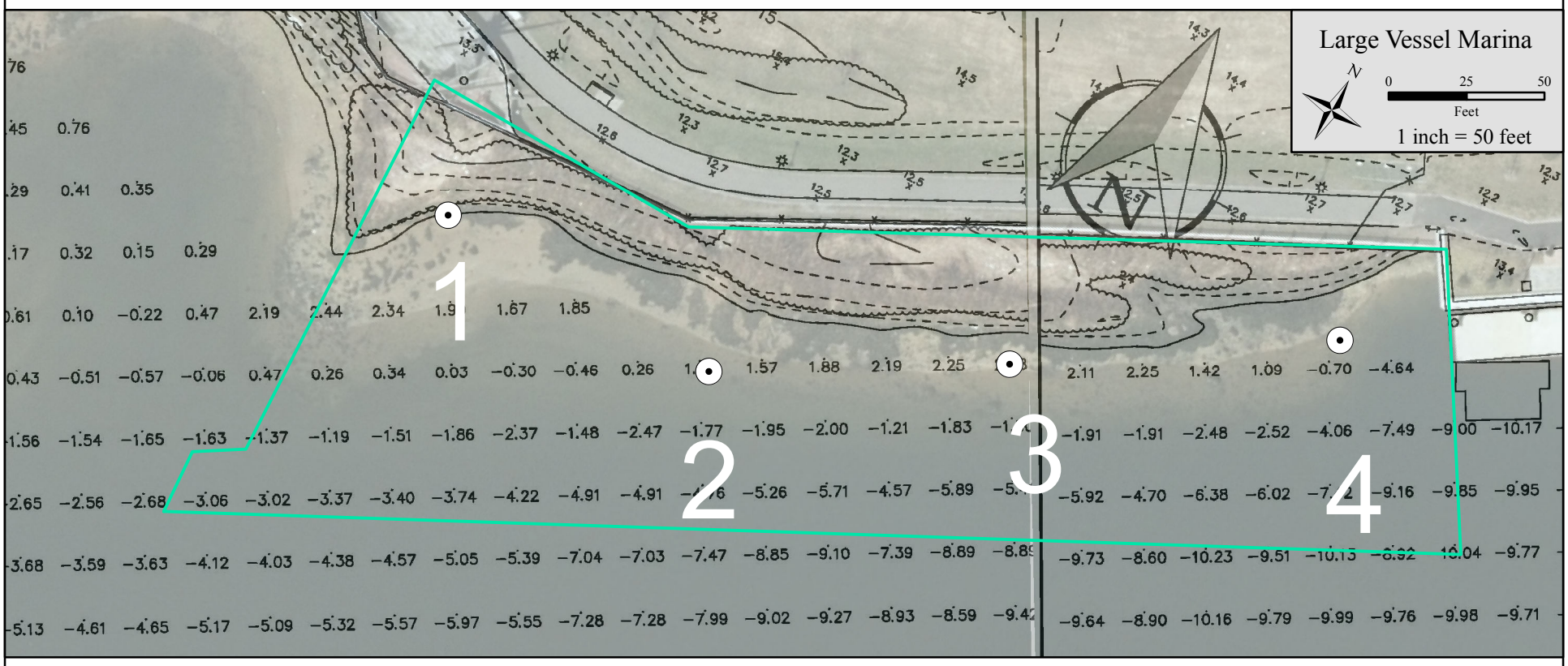
1. Dredge sediment sample number and location based Glen Cove Ferry Terminal Site Management Plan (Dvirka & Bartilucci, 2009). Plan calls for sample every 100 linear feet approximately 25' seaward of the bulkhead line.
   Large Vessel Marina Dredge Area (420+/- lf) N = 4 samples
   Angler's Club Dredge Area (405+/- lf) N = 4 samples
   Transient Marina Dredge Area (500+/- lf) N = 5 samples
2. Sample Previously Collected - Samples collected in accordance with the Pre-Construction Confirmatory/ Data Gap Subsurface Investigation Work Plan (PW Grosser, December 2013).
3. Excavation sediment sampling based on Pre-Construction Confirmatory/Data Gap Subsurface Investigation Work Plan (PW Grosser, 2013).
4. Slope Restoration includes removal of debris and invasive plants, re-grading, and planting with native vegetation. No excavation is proposed. No sampling is proposed.
5. Bathymetric and topographic data based on June 2014 survey map prepared by Advanced American Engineering. Elevations in feet referenced to MLW.

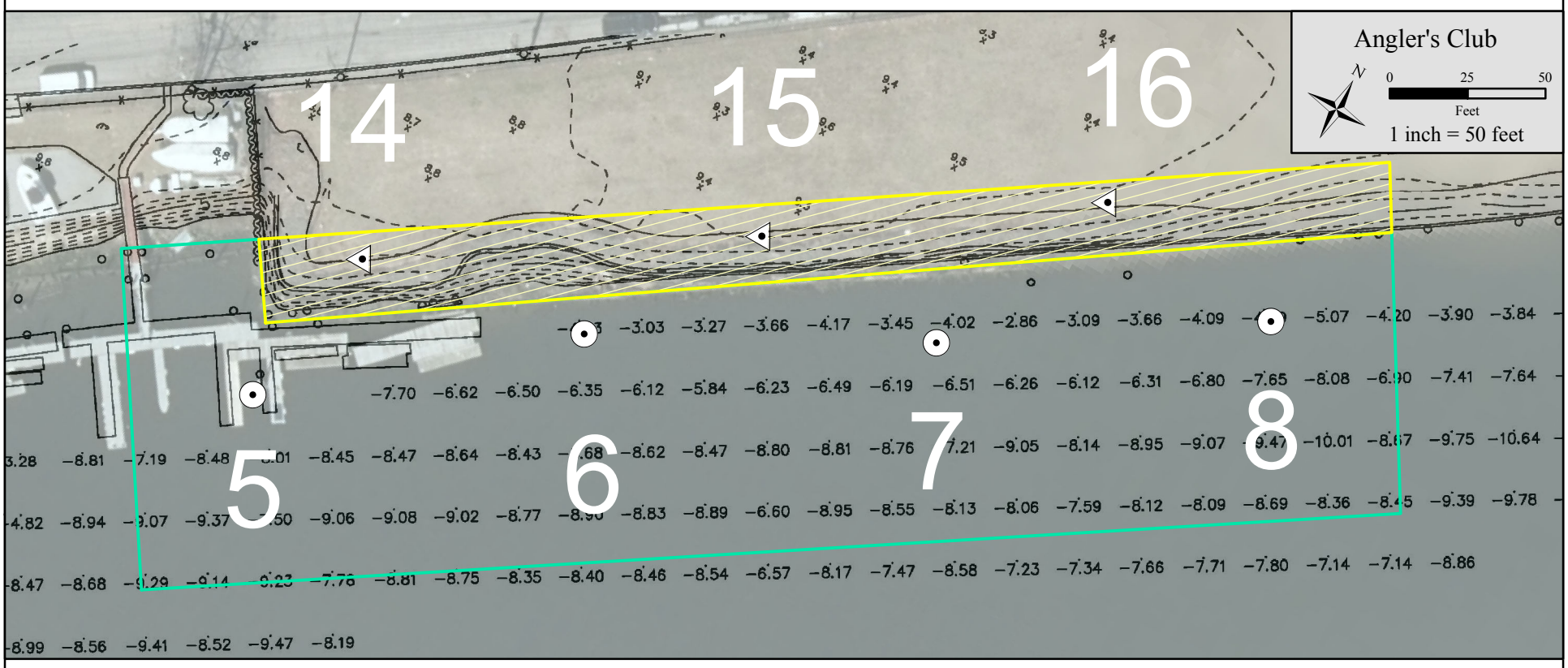
- Existing Outfall
- Dredge Sample
- Excavation Sample
- Sample Previously Collected (Note 2)
- Dredge Area (Note 1)
- Upland Excavation (Note 3)
- Slope Restoration (Note 4)

Land Use Ecological Services, Inc.

Prepared By: Land Use Ecological Services, Inc. 570 Expressway Drive South, Suite 2F Medford, NY 11763 Drawn By: K. Risotto		Project: Glen Cove Creek Mixed Use Waterfront Redevelopment Project Sediment Sample Locations for Proposed Dredging For: RXR Realty 625 RXR Plaze, Uniondale, NY 11556
Date: 6/26/2014	Revised: 9/24/2014, 5/7/2015	Scale: As Noted / FIGURE 6 (Sheet 1 of 2)

Proposed Sediment Sample Locations





NOTES:

1. Dredge sediment sample number and location based Glen Cove Ferry Terminal Site Management Plan (Dvirka & Bartilucci, 2009). Plan calls for sample every 100 linear feet approximately 25' seaward of the bulkhead line.
   Large Vessel Marina Dredge Area (420+/- lf) N = 4 samples
   Angler's Club Dredge Area (405+/- lf) N = 4 samples
   Transient Marina Dredge Area (500+/- lf) N = 5 samples
2. Sample Previously Collected - Samples collected in accordance with the Pre-Construction Confirmatory/Data Gap Subsurface Investigation Work Plan (PW Grosser, December 2013).
3. Excavation sediment sampling based on Pre-Construction Confirmatory/Data Gap Subsurface Investigation Work Plan.
4. Slope Restoration includes removal of debris and invasive plants, re-grading, and planting with native vegetation. No excavation is proposed. No sampling is proposed for the marina dredging permit/application.
5. Bathymetric and topographic data based on June 2014 survey map prepared by Advanced American Engineering. Elevations in feet referenced to MLW.
6. Base Map - 2013 orthoimages courtesy of NYS ITS (http://gis.ny.gov).

- Dredge Sample
- Excavation Sample
- Sample Previously Collected
- Existing Outfall
- Dredge Area
- Upland Excavation

Land Use Ecological Services, Inc.

Prepared By: Land Use Ecological Services, Inc. 570 Expressway Drive South, Suite 2F Medford, NY 11763 Drawn By: K. Risotto	Project: Glen Cove Creek Mixed Use Waterfront Redevelopment Project Sediment Sample Locations for Proposed Dredging For: RXR Realty 625 RXR Plaze, Uniondale, NY 11556
Date: 9/24/2014 — Revised: 5/7/2015	Scale: As Noted — FIGURE 6 (Sheet 2 of 2)